PCAN-Dongle

Parallel Port to CAN Interface

User Manual

PEAK System

Products taken into account

Product Name	Model	Item Number
PCAN-Dongle	DIN	IPEH-002015
PCAN-Dongle	PS/2	IPEH-002019
PCAN-Dongle opto-decoupled	PS/2	IPEH-002020

The cover picture shows the PCAN-Dongle opto-decoupled. The other models have a case with silver-colored coating.

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1 Introduction

Tip: At the end of this manual (Appendix B) you can find a **Quick Reference** with brief information about the installation and operation of the PCAN-Dongle.

This parallel connection to CAN converter is a sensible alternative to using a PCAN-USB adapter for connecting to a CAN network, especially for older PCs and laptops. Depending on the parallel interface present, it can be operated in "Multiplex" or "Enhanced Parallel Port" mode. Power is supplied to the PCAN-Dongle through a special adapter connected to the PC's keyboard output.

The opto-decoupled version also guarantees galvanic isolation of up to 500 Volts between the PC and the CAN sides.

Note: This manual refers to both the PCAN-Dongle standard model as well as the one with galvanic isolation. Differences at use and at the technical specifications are mentioned accordingly in this manual.

1.1 Properties at a Glance

- Logic control by means of integrated CPLD
- Supplied in space-saving port adapter casing D-Sub 25-pin (LPT) to D-Sub 9-pin (CAN)
- Software-driven switching from “Multiplex” to “EPP (Enhanced Parallel Port)” mode
- The voltage supply is through the PS/2 keyboard connection
- Bit rates from 5 kbit/s up to 1 Mbit/s

- Compliant with CAN specifications 2.0A (11-bit ID) and 2.0B (29-bit ID)
- CAN bus connection via D-Sub, 9-pin (in accordance with CiA® 102)
- NXP SJA1000 CAN controller, 16 MHz clock frequency
- NXP PCA82C251 CAN transceiver
- Galvanic isolation on the CAN connection up to 500 V (only opto-decoupled model)
- 5-Volt supply to the CAN connection can be connected through a solder jumper, e.g. for external bus converter
- Operating temperature range from 0 to 60 °C (32 to 140 °F)

Note: This manual describes the use of the PCAN-Dongle with Windows. You can find device drivers for Linux and the corresponding information on PEAK-System's website under www.peak-system.com/linux.

1.2 System Requirements

- A free parallel port (D-Sub, 25 pins) at the computer, capable of interrupts
- Operating system Windows 8.1, 7, Vista (32-bit) or Linux (32/64-bit)

1.3 Scope of Supply

- PCAN-Dongle in plastic casing
- Device drivers for Windows 8.1, 7, Vista (32-bit) and Linux (32/64-bit)
- PCAN-View CAN monitor for Windows 8.1, 7, Vista (32/64-bit)
- PCAN-View CAN monitor for DOS
- PCAN-Basic programming interface consisting of an interface DLL, examples, and header files for all common programming languages
- Manual in PDF format

2 Hardware Installation

2.1 Connecting to the Computer

1. Make sure that the computer is turned off.
2. Connect the PCAN-Dongle with the wider port (25 pins) to the free parallel port at the computer.
3. Pull the keyboard connector from the corresponding port at the computer.
4. Connect the T-piece at the cable of the PCAN-Dongle to the keyboard port.
5. Now reconnect the keyboard to the free end of the T-piece.

A configuration of the hardware is not needed. However, you should check the settings for the parallel interface in the computer's **BIOS setup**.

If the computer has a parallel interface with EPP as well as ECP properties, the corresponding setting in the BIOS set-up should be “ECP” (not “EPP” and not “EPP+ECP”). Although the extended properties of the PCAN-Dongle usually will work with the last-mentioned setting some systems may have problems with it. Therefore the setting for the “pure” ECP mode should be preferred.

Further information about the different operating modes of the PCAN-Dongle can be found in chapter 4.3 *Operating Modes* on page 15.

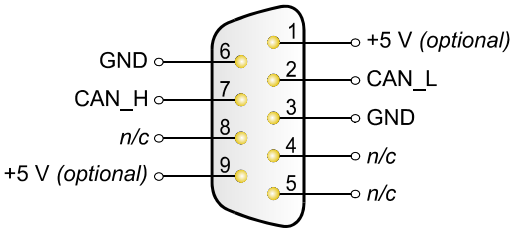
First Test

After turning on the computer the red LED at the PCAN-Dongle must be permanently on. This indicates that the power supply for the PCAN-Dongle is correct.

Attention! Don't remove PCAN-Dongle from the computer while powered on (red LED on PCAN-Dongle is lit). Electronic parts of the PCAN-Dongle or the computer's parallel interface may be harmed.

2.2 Connecting a CAN Bus

A High-speed CAN bus (ISO 11898-2) is connected to the 9-pin D-Sub port. The pin assignment corresponds to the CiA recommendation DS 102-1.



n/c = not connected

Figure 1: Pin assignment HS-CAN
(view onto connector of the PCAN-Dongle)

2.3 5-Volt Supply at the CAN Connector

A 5-Volt supply can optionally be routed to pin 1 and/or pin 9 of the CAN connector (PCAN-Dongle opto-decoupled: pin 1 only) by setting solder bridges on the PCAN-Dongle PCB (Dongle case opened). Thus devices with low power consumption (external

transceivers or optocouplers, for example) can be directly supplied via the CAN connector.

When using this option, the 5-Volt supply is directly connected to the power supply of the PCAN-Dongle (coming from the computer) and is not fused separately. The opto-decoupled model of the Dongle contains an interconnected DC/DC converter. Therefore the current output is limited to about 50 mA.

Attention! At this procedure special care is indispensable, since there is a short circuit danger. The PCAN-Dongle could be destroyed and/or the power supply or electronics of the computer or other components connected could be damaged.

Important note: PEAK-System Technik GmbH does not give guarantee on damages which have resulted from application of the option described in this section.

Do the following to set up a 5-Volt supply at the CAN connector:

1. In order to access the PCB, open the case of the PCAN-Dongle by cautiously levering the latches on both sides (risk of breakage!), e.g. with a flat tip screwdriver.
2. Set the solder bridges on the PCAN-Dongle PCB according to the desired settings. Figure 2 and Figure 3 show the possible positions of a solder bridge.

+5 Volt at the CAN connector:

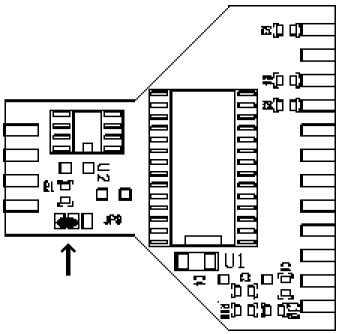


Figure 2:
PCB PCAN-Dongle (bottom view):
JP9, 2-1 (as shown) → Pin 1;
JP9, 2-3 → Pin 9

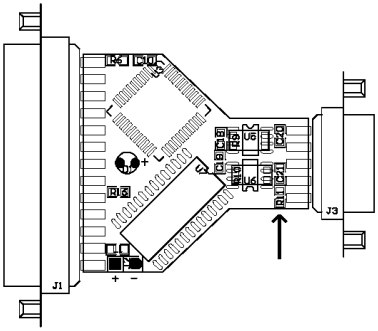


Figure 3:
PCB PCAN-Dongle opto-decoupled
(top view):
short-circuit pos. R11 → Pin 1

3. For reassembly place the PCB overhead onto the top part of the case. Make sure that the cable is lying in the side cut-out with the strain relief inside the case, and that the LED is placed in the corresponding hole of the top part of the case.
4. Push the bottom part of the case onto the top part (the latches click in).

3 Software Setup

This chapter covers the software setup for the PCAN-Dongle under Windows.

Do the following to install the driver:

1. Insert the supplied DVD into the appropriate drive of the computer. Usually a navigation program appears a few moments later. If not, start the file `Intro.exe` from the root directory of the DVD.
2. In the main menu, select **Drivers**, and then click on **Install now**.
3. Confirm the message of the User Account Control regarding the "Installer Database of PEAK Drivers".

   The setup program for the driver is started.
4. Follow the instructions of the program.

4 Operation

4.1 Prerequisites for the Operation

Under Windows you must explicitly determine the use of an interrupt for the parallel interface. This is done in the Windows Device Manager.

Do the following to assign an interrupt to the parallel interface under Windows:

1. Open the Windows Device Manager.

   One way to do this is by accessing the context menu of the desktop icon **My Computer** or **Computer** (right mouse click), by selecting the menu item **Manage**, and then by selecting the entry **Device Manager** from the tree view on the right.

2. Under **Ports (COM & LPT)** in the tree view of the Device Manager double click on the entry **Printer Port (LPTx)** or **ECP Printer Port (LPTx)**.

Figure 4: Entry in the Device Manager for the printer port

3. Select the tab **Port Settings**.
4. Activate the option **Use any interrupt assigned to the port**.

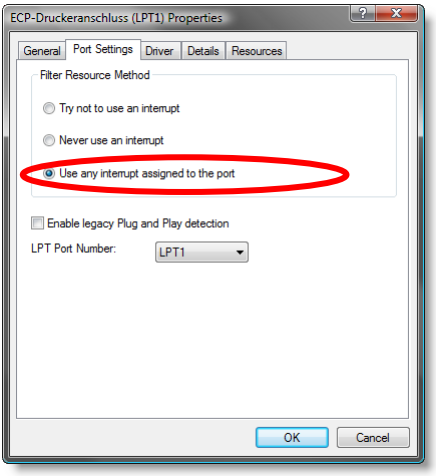


Figure 5: Indicating the use of an interrupt

4.2 Interface Information

For the initialization of the PCAN-Dongle during the start of an application you need information about the used interrupt and port address of the parallel interface.

- Do the following to find out the interrupt and the I/O range used by the parallel interface:

  1. Open the Windows Device Manager.

     One way to do this is by accessing the context menu of the desktop icon **My Computer** or **Computer** (right mouse click), by selecting the menu item **Manage**, and then by selecting the entry **Device Manager** from the tree view on the left.

  2. Under **Ports (COM & LPT)** in the tree view of the Device Manager double click on the entry **Printer Port (LPTx)** or **ECP Printer Port (LPTx)**.

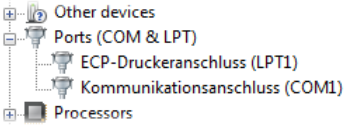


Figure 6: Entry in the Device Manager for the printer port

3. Select the tab **Resources**.
4. From the entries **I/O Range** (first value = port address) and **Interrupt** or **IRQ** in the list you can see the needed information. Write down this information for later use.

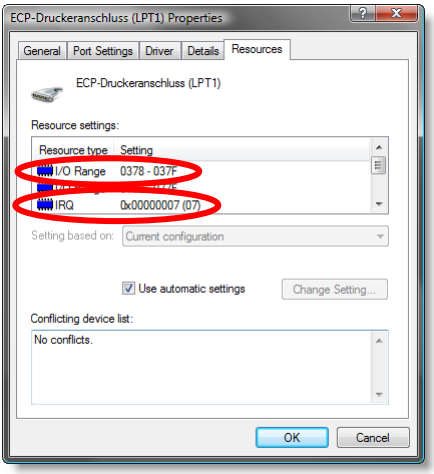


Figure 7: Resource information about the parallel interface

4.3 Operating Modes

The PCAN-Dongle can be used in one of four possible operating modes:

Name of Operating Mode	Alternative Identifier	Description
Multiplex Mode	PEAK Dongle-CAN	Standard Parallel Port (SPP)
EPP Mode	PEAK Dongle-CAN EPP	Extended Capability Port (ECP)
Multiplex PeliCAN Mode	PEAK Dongle-CAN SJA	Standard Parallel Port (SPP), extended CAN functionality (CAN 2.0B incl. 29-bit IDs)
EPP PeliCAN Mode	PEAK Dongle-CAN SJA EPP	Extended Capability Port (ECP), extended CAN functionality (CAN 2.0B incl. 29-bit IDs)

The EPP PeliCAN Mode is recommended to gain the full CAN functionality at lowest possible computer system load. If this mode doesn't work correctly, you can fall back to one of the other operating modes. The Multiplex Mode should work on any system.

Tip: You can find further information about the PeliCAN Mode in the data sheet for the CAN controller SJA1000 by Philips/EXP obtainable at the according website, for example.

You can find information about activating an operating mode in the following section.

4.4 PCAN-View for Windows

PCAN-View for Windows is a simple CAN monitor for viewing and transmitting CAN messages.

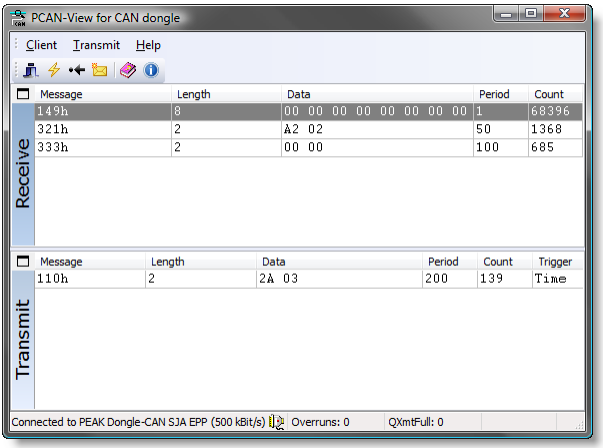


Figure 8: PCAN-View main window

Installation

The installation is done during the driver installation (see also chapter 3 *Software Setup* on page 11).

Program Start

Open the Windows Start menu or the Windows Start page and select **PCAN-View**.

The dialog box for selecting the hardware and for setting the parameters appears.

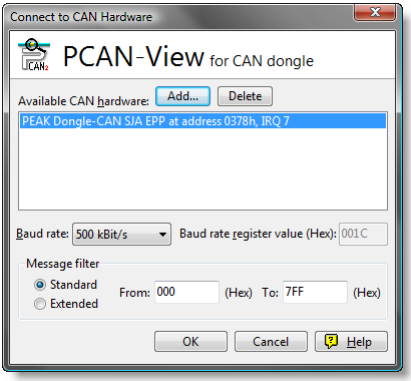


Figure 9: Selection of the CAN specific parameters

If **no entry** is in the list “Available CAN hardware” (for example at the first program start), you need to add one (administrator rights needed):

1. Press the button **Add**. The dialog box “Add CAN hardware” appears.
2. Select the connected hardware and the operating mode from the list “Type of CAN hardware”. If the mode of the parallel interface is set to ECP in the computer's BIOS setup, you can register the PCAN-Dongle as “PEAK Dongle-CAN SJA EPP”.

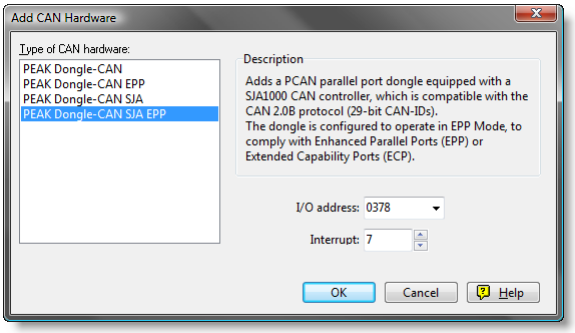

Add CAN Hardware
Type of CAN hardware:
PEAK Dongle-CAN
PEAK Dongle-CAN EPP
PEAK Dongle-CAN SJA
PEAK Dongle-CAN SJA EPP
Description
Adds a PCAN parallel port dongle equipped with a SJA1000 CAN controller, which is compatible with the CAN 2.0B protocol (29-bit CAN-IDs).
The dongle is configured to operate in EPP Mode, to comply with Enhanced Parallel Ports (EPP) or Extended Capability Ports (ECP).
I/O address: 0378
Interrupt: 7
OK
Cancel
Help

Figure 10: Selection of hardware resources

3. Enter the port address and the interrupt of the used parallel interface established before (see section above).
4. Confirm your input with **OK**.

In the dialog box “Connect to CAN hardware” make **further settings** (baud rate and CAN message filter) for the created hardware entry.

If you need further help after the program start, use the online help provided with the program (key [F1]).

5 Linking Own Programs with PCAN-Light

On the supplied CD-ROM you can find files that are provided for software development. You can access them with the navigation program (button **Programming**). The files exclusively serve the linking of own programs to hardware by PEAK-System with the help of the installed device driver under Windows.

Further more the CD-ROM contains header files and examples for creating own applications in conjunction with the PCAN-Light drivers. Please read the detailed documentation of the interface (API) in each header file.

Tip: You can find further information in the file `PCANLight_enu.chm` (Windows Help file) on the CD-ROM.

Notes about the License

Device drivers, the interface DLL, and further files needed for linking are property of the PEAK-System Technik GmbH (PEAK-System) and may be used only in connection with a hardware component purchased from PEAK-System or one of its partners. If a CAN hardware component of third party suppliers should be compatible to one of PEAK-System, then you are not allowed to use or to pass on the driver software of PEAK-System.

PEAK-System assumes no liability and no support for the PCAN-Light driver software and the necessary interface files. If third party suppliers develop software based on the PCAN-Light driver and problems occur during use of this software, please, consult the software provider. To obtain development support, you need to own a PCAN-Developer or PCAN-Evaluation version.

6 Frequently Asked Questions (FAQ)

Question	Answer
In the computer's BIOS setup the parallel port setting shows **ECP** but the PCAN-Dongle works with the **EPP** mode. Is this correct?	Yes, it is. The naming of the operating mode EPP of the PCAN-Dongle has historical causes. The parallel interface at the computer went through various developments in the nineties. Only the EPP extension existed during the time, when the PCAN-Dongle arose. With version 1.9 the EPP extension already had similarities to the ECP extension, which is usually used in computers today. The name of the operating mode EPP was kept for the PCAN-Dongle.
Can a **printer** still be connected to the PCAN-Dongle?	No. The PCAN-Dongle doesn't offer any possibility to connect through the parallel interface for the printer.
Is it possible to **supply** the PCAN-Dongle PS/2 also via the computer's **mouse connector**?	Yes.
I have problems running the PCAN-Dongle under **Windows Vista/XP/2000**.	The driver files PEAKCAN.SYS and PCAN_DNG.SYS must be available at least in version 2.30. You can determine the currently used driver version e.g. with the About dialog box in PCAN-View (menu command **Help | About**).

7 Technical Specifications

Supply	
Supply voltage	+5 V DC
Current consumption	PCAN-Dongle: max. 80 mA PCAN-Dongle opto-decoupled: max. 140 mA

Connectors	
Supply	Cable to the keyboard jack of the computer, length about 50 cm/20 inches
Computer	D-Sub (m), 25 pins (to standard parallel port)
CAN	D-Sub (m), 9 pins Pin assignment according to CiA recommendation DS 102-1 IPEH-002020: galvanic isolation up to 500 V

CAN	
Specification	ISO 11898-2 High-speed CAN (up to 1 MBit/s) 2.0A (standard format) and 2.0B (extended format)
Controller	Philips SJA1000T
Transceiver	Philips PCA82C251

Environment	
Operating temperature	0 – 60 °C (32 – 140 °F)
Storage temperature	-20 – +80 °C (-4 – 176 °F)
Relative humidity	15 – 90 %, not condensing
EMC	EN 55024:2011-09 EN 55022:2011-12 EC directive 2004/108/EG

Continued on the next page

Measures	
Size	56 x 18 x 62 mm (2 3/16 x 11/16 x 2 7/16 Inches)
Weight	PCAN-Dongle (DIN): 52 g (1.83 oz.) PCAN-Dongle (PS/2): 51 g (1.80 oz.) PCAN-Dongle opto-decoupled: 52 g (1.83 oz.)

Appendix A CE Certificate

PCAN-Dongle IPEH-002015/19/20 – EC Declaration of Conformity
PEAK-System Technik GmbH

Notes on the CE Symbol CE

The following applies to the "PCAN-Dongle" product with the item number(s) IPEH-002015/19/20.

EC Directive This product fulfills the requirements of EU EMC Directive 2004/108/EG (Electromagnetic Compatibility) and is designed for the following fields of application as for the CE marking:

Electromagnetic Immunity
DIN EN 55024, publication date 2011-09
Information technology equipment – Immunity characteristics – Limits and methods of measurement (CISPR 24:2010);
German version EN 55024:2010

Electromagnetic Emission
DIN EN 55022, publication date 2011-12
Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement (CISPR 22:2008, modified);
German version EN 55022:2010

Declarations of Conformity In accordance with the above mentioned EU directives, the EC declarations of conformity and the associated documentation are held at the disposal of the competent authorities at the address below:

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E-mail: info@peak-system.com

Signed this 22nd day of October 2013

Appendix B Quick Reference

Hardware Installation

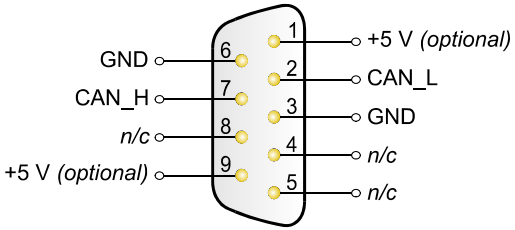
Connect the PCAN-Dongle to the computer's parallel port, insert the T-piece at the cable's end between the keyboard port at the computer and the keyboard connector (for power supply). When the computer is turned on, the red **LED** indicates an existing power supply.

Software setup and startup under Windows

Execute the driver installation program from the supplied CD-ROM. Restart Windows after the setup procedure.

Run the CAN monitor PCAN-View for Windows from the Start menu as a sample application for accessing the PCAN-Dongle. Get the parameters of the parallel interface (I/O address, interrupt) needed for initialization of the PCAN-Dongle from Windows' Device Manager.

HS-CAN connector (D-Sub, 9 pins)



n/c = not connected